Howto's

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Documentation

- I've figured out how to do a few simple things with the G4 data, and I'd like to know more

- I thought rather than keeping it in my notebook, I'd start adding to the Wiki under software:

  https://wiki.bnl.gov/sPHENIX/index.php/Main_Page

Just a start right now…

Software

- **Code Repository**: How and where to get the sPHENIX code and how it is organized
- **Setting yourself up**: What do you need to run this?
- **How to get to the G4 cmd line**: Some useful things to type on the G4 cmd line
- **Display simulated Events**: How to start the G4 event display (be warned that is painful)
- **HepMC related code**: Reading/Writing/Analysing HepMC ASCII files in Fun4All
- **Tools to make your life easier**: Coding tools we have around to help you
  - Doxygen software reference 🔒 : a digested reference website for sPHENIX core software, which is updated every a few hours and cross linked to GitHub repository.
- **whatever it takes to make this work**: We all know there comes a time we have to modify 3rd party software to make it work for us
- **How to analyze Monte Carlo data**: How to do some simple analysis of generated G4 data

What's in the svtx evaluator?

The ntuples produced with Svtx_Eval() by the Fun4All_G4_sPHENIX.C macro have a lot of information about the event beyond just tracking information. Inside an eval ntuple fileyou will find:

```
root [0] TFile f("G4Hits_sPHENIX_pi-_eta0_8GeV-0000_g4svtx_eval.root")
root [1] .ls
TFile**         G4Hits_sPHENIX_pi-_eta0_8GeV-0000_g4svtx_eval.root
 TFile*         G4Hits_sPHENIX_pi-_eta0_8GeV-0000_g4svtx_eval.root
  KEY: TNtuple  ntp_vertex;1    vertex => max truth
  KEY: TNtuple  ntp_gpoint;1    g4point => best vertex
  KEY: TNtuple  ntp_g4hit;1     g4hit => best svtxcluster
  KEY: TNtuple  ntp_hit;1       svtxhit => max truth
  KEY: TNtuple  ntp_cluster;1   svtxcluster => max truth
  KEY: TNtuple  ntp_gtrack;1    g4particle => best svtxtrack
  KEY: TNtuple  ntp_track;1     svtxtrack => max truth
```

The ntuple ntp_track has the following saved quantities:

- Br 0 :event : Float_t Event number, sequential, starting at 0
- Br 1 :trackID : Float_t
- Br 2 :px : Float_t
- Br 3 :py : Float_t
- Br 4 :pz : Float_t
- Br 5 :charge : Float_t
- Br 6 :quality : Float_t
- Br 7 :chisq : Float_t
- Br 8 :ndf : Float_t
- Br 9 :nhits : Float_t
- Br 10 :layers : Float_t
- Br 11 :dca2d : Float_t
- Br 12 :dca2dsigma : Float_t
- Br 13 :pcax : Float_t
- Br 14 :pcay : Float_t
- Br 15 :pcaz : Float_t

Good? Bad? A better plan?

- Is that a good way to document what is known? Bad? Is there a better way?

- It's ***not*** mine, but I'll work on it if it's possibly useful to other people (I still have the notebook)